

PATENT ABSTRACTS OF JAPAN

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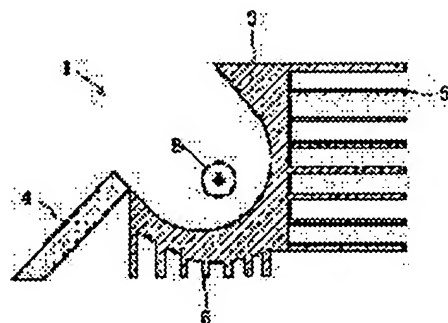
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(54) EXPOSURE UNIT AND FIXING UNIT

(57)Abstract:

PROBLEM TO BE SOLVED: To improve cooling efficiency by providing a cooling fin.

SOLUTION: An exposure unit 1 generates heat by turning on a halogen lamp 2 in the case of operation, and a reflector 3 is heated by the generated heat of the lamp 2. A radiating fin 5 is formed on the reflector 3, and air is sent to the reflector 3 and the fin 5 along the disposing direction of the fin 5 from a fan. The heat of the reflector 3 is efficiently radiated through the fin 5 by the air from fan sent to the fin 5, so that the temperature of the reflector 3 is restrained from rising.



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TITLE: Exposure system with cooling function for laser printer, copier, **scanner** - includes radiating fins arranged on rear surface of **reflective plate** for dissipation of heat produced on **reflective plate** by heat emission of halogen lamp

PATENT-ASSIGNEE: RICOH KK[RICO]

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INT-CL (IPC): F25D001/00, G03B027/52 , G03G015/04 , G03G015/20

ABSTRACTED-PUB-NO: JP 10197969A

BASIC-ABSTRACT:

The system (1) has a halogen lamp (2). A reflective plate (3) is arranged around the lamp at a predetermined distance.

Several fins (5) are provided on the rear surface of the reflective plate for dissipation of heat produced by the heat emission of the halogen lamp. A fan is provided to blast forced air on the fins and the reflective plate for

effective dissipation of heat.

ADVANTAGE - Radiates heat produced on reflective plate efficiently and effectively, thereby prevents temperature rise of exposure system. Improves cooling efficiency.

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: EXPOSE SYSTEM COOLING FUNCTION LASER PRINT COPY
SCAN RADIATE FIN

ARRANGE REAR SURFACE REFLECT PLATE DISSIPATE HEAT PRODUCE
REFLECT

PLATE HEAT EMIT HALOGEN LAMP

DERWENT-CLASS: P82 P84 Q75 S06 T04 W02

EPI-CODES: S06-A03D; S06-A19B; T04-G04A1; W02-J01A; W02-J05;

SECONDARY-ACC-NO:

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CLAIMS

[Claim(s)]

[Claim 1] The exposure unit characterized by being the exposure unit equipped with the predetermined distance detached building ***** reflecting mirror from the exposure lamp concerned, and preparing the fin for heat dissipation in said exposure lamp of said reflecting mirror, and the field of the opposite side in the predetermined range around the exposure lamp which irradiates light at a manuscript, and said exposure lamp.

[Claim 2] Said reflecting mirror is an exposure unit according to claim 1 characterized by attaching the fan who ventilates said fin for heat dissipation in air.

[Claim 3] Said fin for cooling is claim 1 characterized by being arranged in parallel to the flow direction of the air which flows the perimeter of said reflecting mirror, and an exposure unit according to claim 2.

[Claim 4] The fixing unit are the fixing unit equipped with the fixing roller by which is heated at a heater and a rotation drive is carried out, the pressurization roller which a pressure welding is carried out to said fixing roller, and rotates with said fixing roller, and said pressurization roller of said fixing roller and the fan who ventilates [opposite side] the perimeter of wrap fixing covering and said fixing covering in air at least, and carry out that the fin for heat dissipation is prepared in the passage part of the air from said fan of said fixing covering at least as the description.

[Claim 5] The fixing roller by which is heated at a heater and a rotation drive is carried out, and the pressurization roller which a pressure welding is carried out to a fixing fixing roller, and rotates with a fixing fixing roller, At least said pressurization roller and opposite side of said fixing roller Wrap fixing covering, The fixing unit characterized by being the fixing unit equipped with the fan who ventilates the perimeter of said fixing covering in air, preparing the fin for heat dissipation in the field by the side of said fixing roller of said fixing covering, and turning said fan's ventilation direction to the fin for heat dissipation concerned.

[Claim 6] It is the fixing unit according to claim 5 characterized by forming said fixing covering by the adiathermic good member, and forming said fin for heat dissipation by the member with good thermal conductivity.

[Translation done.]

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the exposure unit and fixing unit which raised cooling effectiveness in the detail about an exposure unit and a fixing unit.

[0002]

[Description of the Prior Art] In a copying machine, a laser beam printer, a scanner, etc., it has exoergic units, such as an exposure unit and a fixing unit, and it is an important problem how heat is radiated and the heat generated from these exoergic units is exhausted.

[0003] For example, a copying machine will be divided into the optical unit which used the lamp which reads a manuscript optically, the imaging unit which performs each process of electrification -> exposure -> development -> imprint -> electric discharge for a photo conductor, a development unit, the fixing unit which carries out welding of the toner in the copy paper to paper, and a pan by five units of a power supply unit if the unit configuration is divided roughly.

[0004] Only a fixing unit needs heat among these five units, heat occurs as a side effect and it is important for other units how heat is radiated and these generated heat is exhausted so that neither electronic parts nor process control may be affected.

[0005] In an optical unit, the reflecting plate arranged in the perimeter of a halogen lamp since the halogen lamp was generally used is heated by the exposure unit with a halogen lamp, the life of a halogen lamp is affected, or the metal side of a reflecting plate oxidizes, and the problem of the quantity of light irradiated by the manuscript decreasing arises.

[0006] Although the fan was attached and the whole exposure unit was cooled in order to cool an exposure unit conventionally, the hot spot where temperature is high cannot be cooled efficiently.

[0007] Moreover, the heat which the fixing unit needs has a thermal effect on surrounding passive circuit elements etc., or a fixing unit raises the temperature in [whole] a copying machine, and fault, such as having a bad influence on process control, produces it. Then, generally, although the heat exhaust air by the fan was performed or measures, such as heat insulation, were taken, effectiveness was not able to say conventionally that it was good too.

[0008] In addition, the conventional air-cooling method of general electronic equipment as indicated by JP,63-108800,A As passage is secured for the flow of the air of air supply and exhaust within a case, it cools or nature and forced-air cooling are indicated by JP,2-82693,A by making a case into a first-class way Having the inhalation means and ventilating fan for circulating air within and without a case, and forming a septum so that the flow of air may be made to separate, and cooling an equipment is performed.

[0009] Moreover, the technique of raising the cooling engine performance is indicated by JP,6-318124,A by centralizing a high heater element on one place, and connecting with the heat sink which turned and prepared them in the case exterior.

[0010]

[Problem(s) to be Solved by the Invention] However, in addition in such a conventional cooling technique, it is not enough as a cooling technique of the device equipped with the exposure unit or the fixing unit.

[0011] Namely, although above-mentioned JP,63-108800,A and the conventional technique given in JP,2-82693,A can expect sufficient cooling effect when securing the airstream way which connects the inside and outside of a case in a case and cooling the whole case. If it was in the device equipped with the exposure unit or the fixing unit, still more efficient cooling needed to be performed, the cooling effect to mean was not acquired and each above-mentioned conventional technique had problems – sufficient cooling effect is not acquired by the rise of the exoergic consistency accompanying the miniaturization of a device.

[0012] Moreover, the conventional technique given [above-mentioned] in JP,6-318124,A is suitable when cooling the junction component of a substrate board with a heat sink, but when it has the exoergic unit as the configuration unit, in order that the part to cool may attain to the whole unit like a copying machine, it does not serve as sufficient solution means.

[0013] It is important for a copying machine, a laser beam printer, a scanner, etc. that there is a unit for which the configuration unit uses heat like a fixing unit especially unlike a computer and other electronic equipment, and a unit with large calorific value also cools a thermal design intricately and efficiently like an exposure unit for a certain reason.

[0014] Furthermore, recently, the miniaturization of a device progresses, a downsizing design is performed also for each unit of a device, and by this miniaturization, while the exoergic consistency of each unit rises, reservation of the space which a case dimension spares for installation of a cooling fan by becoming small, and cooling passage is becoming difficult.

[0015] Then, by establishing the perimeter of an exposure lamp for the fin for heat dissipation in the exposure lamp of a wrap reflecting mirror, and the field of the opposite side, invention according to claim 1 radiates heat efficiently through the fin for heat dissipation in the heat of a reflecting mirror, suppresses the temperature rise of a reflecting plate low, and aims at offering the exposure unit which cools efficiently the exposure lamp which is the light source of an exposure unit, and the reflecting mirror surrounding it.

[0016] Invention according to claim 2 ventilates the fin for heat dissipation directly and effectively from a fan by ***** with picking in the fan who ventilates in air the fin for heat dissipation prepared in the reflecting plate, cools the fin for heat dissipation, and aims at offering the exposure unit which can raise cooling effectiveness further.

[0017] By arranging the fin for cooling in parallel to the flow direction of the air which flows the perimeter of a reflecting mirror, invention according to claim 3 aims at offering the exposure unit which can raise cooling effectiveness further, as air flows along the array side of the fin for heat dissipation.

[0018] Invention according to claim 4 by carrying out the pressure welding of a fixing roller and the pressurization roller, and preparing the fin for heat dissipation in the passage part of the air from the fan of the fixing covering of the fixing unit with which the fixing roller was covered with fixing covering concerned Heat is radiated with the air from a fan which flows the fin for heat dissipation in the heat of fixing covering, the temperature of a fixing covering front face is reduced efficiently, and it aims at offering the fixing unit which can prevent the thermal effect to a perimeter.

[0019] While invention according to claim 5 prepares the fin for heat dissipation in the field by the side of the fixing roller of the fixing covering of the fixing unit with which the pressure welding of a fixing roller and the pressurization roller was carried out, and the fixing roller was covered with fixing covering concerned With the fin for heat dissipation prepared in the field by the side of a fixing roller not only heat insulation but for heat dissipation by ventilating this fin for heat dissipation from a fan using fixing covering It aims at offering the fixing unit which can

decrease the heating value which cools with the air from a fan and is transmitted [heat / endoergic and / which carried out the collection of heat and was brought together in the fin for heat dissipation] outside from fixing covering in the excessive heat from a fixing roller.

[0020] By invention according to claim 6 forming fixing covering by the adiathermic good member, and forming the fin for heat dissipation by the member with good thermal conductivity the good fin for heat dissipation of the thermal conductivity of a copper alloy, an aluminium alloy, etc. — surrounding heat — more — much more — a response — good — endoergic — or, while carrying out a collection of heat It aims at offering the fixing unit which can control further that the heat from a fixing roller is transmitted outside with adiathermic fixing coverings, such as heat-resistant plastics.

[0021]

[Means for Solving the Problem] The exposure unit of invention according to claim 1 has attained the above-mentioned purpose by being the exposure unit equipped with the predetermined distance detached building ***** reflecting mirror from the exposure lamp concerned, and preparing the fin for heat dissipation in said exposure lamp of said reflecting mirror, and the field of the opposite side in the predetermined range around the exposure lamp which irradiates light at a manuscript, and said exposure lamp.

[0022] According to the above-mentioned configuration, since the perimeter of an exposure lamp is established for the fin for heat dissipation in the exposure lamp of a wrap reflecting mirror, and the field of the opposite side, heat can be efficiently radiated through the fin for heat dissipation in the heat of a reflecting mirror, the temperature rise of a reflecting plate can be suppressed low, and the exposure lamp which is the light source of an exposure unit, and the reflecting mirror surrounding it can be cooled efficiently.

[0023] The fan by whom said reflecting mirror ventilates said fin for heat dissipation in air may be attached so that it may indicate to claim 2 in this case.

[0024] Since the fan who ventilates in air the fin for heat dissipation prepared in the reflecting plate is attached according to the above-mentioned configuration, the fin for heat dissipation can be ventilated directly and effectively from a fan, the fin for heat dissipation and a reflecting plate can be cooled, and cooling effectiveness can be raised further.

[0025] Moreover, for example, said fin for cooling may be arranged in parallel to the flow direction of the air which flows the perimeter of said reflecting mirror so that it may indicate to claim 3.

[0026] Since the fin for cooling is arranged in parallel to the flow direction of the air which flows the perimeter of a reflecting mirror according to the above-mentioned configuration, air can flow along the array side of the fin for heat dissipation, and cooling effectiveness can be raised further.

[0027] The fixing roller by which the fixing unit of invention according to claim 4 is heated at a heater, and a rotation drive is carried out, The pressurization roller which a pressure welding is carried out to said fixing roller, and rotates with said fixing roller, At least said pressurization roller and opposite side of said fixing roller Wrap fixing covering, It is the fixing unit equipped with the fan who ventilates the perimeter of said fixing covering in air, and the above-mentioned purpose is attained by preparing the fin for heat dissipation in the passage part of the air from said fan of said fixing covering at least.

[0028] Since the fin for heat dissipation has been prepared in the passage part of the air from the fan of the fixing covering of the fixing unit with which the pressure welding of a fixing roller and the pressurization roller was carried out, and the fixing roller was covered with fixing covering concerned according to the above-mentioned configuration, heat can be radiated by the air from a fan which flows the fin for heat dissipation in the heat of fixing covering, the temperature of the front face of fixing covering can be reduced efficiently, and the thermal effect to a perimeter can be prevented.

[0029] The fixing roller by which the fixing unit of invention according to claim 5 is heated at a heater, and a rotation drive is carried out, The pressurization roller which a pressure welding is carried out to a fixing fixing roller, and rotates with a fixing fixing roller, At least said pressurization roller and opposite side of said fixing roller Wrap fixing covering, It is the fixing unit equipped with the fan who ventilates the perimeter of said fixing covering in air, and the fin for heat dissipation was prepared in the field by the side of said fixing roller of said fixing covering, and the above-mentioned purpose is attained by turning said fan's ventilation direction to the fin for heat dissipation concerned.

[0030] While preparing the fin for heat dissipation in the field by the side of the fixing roller of the fixing covering of the fixing unit with which the pressure welding of a fixing roller and the pressurization roller was carried out, and the fixing roller was covered with fixing covering concerned according to the above-mentioned configuration Since this fin for heat dissipation is ventilated from a fan, with the fin for heat dissipation prepared in the field by the side of a fixing roller not only heat insulation but for heat dissipation using fixing covering The heating value which can cool with the air from a fan and is transmitted [heat / endoergic and / which carried out the collection of heat and was brought together in the fin for heat dissipation] outside from fixing covering in the excessive heat from a fixing roller can be decreased.

[0031] Said fixing covering may be formed by the adiathermic good member, and said fin for heat dissipation may be formed by the member with good thermal conductivity so that it may indicate to claim 6 in this case.

[0032] Since according to the above-mentioned configuration fixing covering is formed by the adiathermic good member and the fin for heat dissipation is formed by the member with good thermal conductivity, while being able to carry out a collection of heat, it can control further endoergic or that the heat from a fixing roller is transmitted outside with adiathermic fixing coverings, such as heat-resistant plastics, for surrounding heat with a much more sufficient response with the good fin for heat dissipation of the thermal conductivity of a copper alloy, an aluminium alloy, etc.

[0033]

[Embodiment of the Invention] Hereafter, the gestalt of suitable operation of this invention is explained to a detail based on an accompanying drawing. In addition, since the gestalt of the operation described below is a gestalt of suitable operation of this invention, desirable various limitation is attached technically, but especially the range of this invention is not restricted to these modes, as long as there is no publication of the purport which limits this invention in the following explanation.

[0034] Drawing 1 is drawing showing the gestalt of operation of the 1st of the exposure unit of this invention, and the gestalt of this operation corresponds to claim 1 and claim 3. Drawing 1 is the side-face sectional view of the exposure unit 1 which applied the gestalt of operation of the 1st of the exposure unit of this invention.

[0035] In drawing 1, the exposure unit 1 is equipped with the halogen lamp 2 and reflecting plate 3 as the light source, and air is ventilated by the field of drawing 1 in the direction of a vertical from the fan who does not illustrate to the exposure unit 1.

[0036] According to manuscript reading width of face, the halogen lamp 2 has predetermined die length, and irradiates light at the manuscript which is not illustrated. The light reflected with this manuscript is introduced into optoelectric transducers (for example, CCD (Charge Coupled Device) etc.) through the optical system of the 1st mirror 4 and others, and is changed into image data by the optoelectric transducer.

[0037] Predetermined spacing detached building ***** of the reflecting plate 3 is carried out with the halogen lamp 2, the field by the side of a halogen lamp 2 is formed in an about U character mold, and it is polished in the mirror plane. The fin 5 for heat dissipation projected to the method of outside is formed in the halogen lamp 2 of a reflecting plate 3, and the external

surface of the opposite side from the external surface concerned of a reflecting plate 3, and the fin 5 for heat dissipation is formed all over the external surface of a reflecting plate 3. Each fin 5 for heat dissipation is formed in the direction perpendicular to the field of drawing 1 for a long time, and is arranged in parallel in the ventilation direction from the above-mentioned fan. The reflecting plate 3 and the fin 5 for heat dissipation are formed by a member with both good thermal conductivity, for example, an aluminum containing alloy.

[0038] Next, actuation of the gestalt of this operation is explained. If a halogen lamp 2 is turned on at the time of actuation, a halogen lamp 2 will generate heat and, as for the exposure unit 1, a reflecting plate 3 will be heated by generation of heat of a halogen lamp 2. However, the fin 5 for heat dissipation is formed in the reflecting plate 3, and air is ventilated from a direction perpendicular to the space of drawing 1 from the fan who does not illustrate at a reflecting plate 3 and the fin 5 for heat dissipation. Therefore, the heat of a reflecting plate 3 can radiate heat efficiently through the fin 5 for heat dissipation with a fan's air ventilated by the fin 5 for heat dissipation, and can control the temperature rise of a reflecting plate 3.

[0039] Moreover, since the fin 5 for heat dissipation is arranged in parallel with the flow of the air from a fan and is formed, the air from a fan can flow between the fins 5 for heat dissipation along with the fin 5 for heat dissipation, and it can radiate heat much more efficiently from the fin 5 for heat dissipation.

[0040] <Example of an experiment> The exposure unit 1 of the gestalt of the above-mentioned implementation was used, and the comparative experiments of the cooling effect with the conventional exposure unit of only the reflecting plate with which the fin for heat dissipation is not formed were conducted.

[0041] In order for an experiment to stick a thermocouple, respectively the inside of the reflecting plate 3 of the exposure unit 1 of the gestalt of this operation, and inside the reflecting plate of the conventional exposure unit and not to saturate a temperature rise, the line performed the temperature comparison of the reflecting plate 3 of the exposure unit 1 of the gestalt of this operation with which the thermocouple at that time detected continuation copy actuation by 100 sheets, and the reflecting plate of the conventional exposure unit. In addition, both the reflecting plate 3 of the exposure unit 1 of the gestalt of this operation and the reflecting plate of the conventional exposure unit are formed of aluminum in this case.

[0042] In the conventional exposure unit to which, as for the experimental result, a fin is not attached, the rise temperature (increment from a room temperature) of a reflecting plate was as high as 50 degrees C, and fault had produced the reflecting plate made from aluminum also for mechanical precision -- when it becomes cloudy locally by scaling or an exposure unit scans, a squeak carries out.

[0043] On the other hand, if it was in the exposure unit 1 of the gestalt of this operation, rise temperature was as low as 35 degrees C, and faults by oxidation of the front face of the reflecting plate 3 which had been produced conventionally, such as local nebula and a squeak, were canceled. Therefore, it was checked by forming the fin 5 for heat dissipation in the front face of a reflecting plate 3 that the cooling effect is improving.

[0044] Drawing 2 is drawing showing the gestalt of operation of the 2nd of the exposure unit of this invention, and the gestalt of this operation corresponds to claim 2 and claim 3.

[0045] In addition, the gestalt of this operation is applied to the same exposure unit as the gestalt of implementation of the above 1st, gives the same sign to the same component as the exposure unit of the gestalt of implementation of the above 1st in explanation of the gestalt of this operation, and omits the detailed explanation.

[0046] In drawing 2, the exposure unit 10 is equipped with the halogen lamp 2, the reflecting plate 3, and fan 11 who do not illustrate, and the fin 5 for heat dissipation is formed in the reflecting plate 3.

[0047] The fan 11 is attached in the one side side face (left-hand side side face of drawing 21)

of a reflecting plate 3, and ventilates air toward a reflecting plate 3 and a halogen lamp 2. That is, the fan 11 is attached in the reflecting plate 3 with which the fin 5 was formed as one. The fin 5 for heat dissipation currently formed in the reflecting plate 3 is formed in parallel along the flow direction of the air from a fan 11, and the air ventilated by the fan 11 flows along with a fin 5. That to which the thing of 40mmx40mm and $t=10\text{mm}$ thickness is used, and this fan 11 operates with the direct current voltage (DC) of 12 [V] and the current of 80 [mA] is used. The rotation drive of the fan 11 is carried out synchronizing with lighting actuation of a halogen lamp 2.

[0048] Therefore, since according to the gestalt of this operation the fan 11 is attached while forming the fin 5 for heat dissipation in a reflecting plate 3, while carrying out air cooling of a halogen lamp and the reflecting plate 3 with the air from a fan 11, the heat of a reflecting plate 3 can be made to be able to radiate heat much more efficiently through the fin 5 for heat dissipation, and the temperature rise of a reflecting plate 3 can be controlled further. Since the fin 5 for heat dissipation is especially arranged along a fan's 11 ventilation direction, the air from a fan 11 can flow between the fins 5 for heat dissipation along with the fin 5 for heat dissipation, and can radiate heat much more efficiently from the fin 5 for heat dissipation in the heat of a reflecting plate 3.

[0049] <Example of an experiment> The exposure unit 10 of the gestalt of the above-mentioned implementation was used, and the comparative experiments of the cooling effect with the conventional exposure unit of only the reflecting plate with which the fin for heat dissipation is not formed were conducted.

[0050] In order for an experiment to stick a thermocouple on the reflecting plate of the inside of the reflecting plate 3 of the exposure unit 10 of the gestalt of this operation, and the conventional exposure unit, respectively and not to saturate a temperature rise, the line performed the temperature comparison of the reflecting plate 3 of the exposure unit 1 of the gestalt of this operation with which the thermocouple at that time detected continuation copy actuation by 100 sheets, and the reflecting plate of the conventional exposure unit. In addition, both the reflecting plate 3 of the exposure unit 10 of the gestalt of this operation and the reflecting plate of the conventional exposure unit are formed of aluminum in this case.

[0051] In the conventional exposure unit to which, as for the experimental result, a fin is not attached, the rise temperature (increment from a room temperature) of a reflecting plate was as high as 50 degrees C like the above-mentioned example of an experiment, and fault had produced the reflecting plate made from aluminum also for mechanical precision – when it becomes cloudy locally by scaling or an exposure unit scans, a squeak carries out.

[0052] On the other hand, if it was in the exposure unit 10 of the gestalt of this operation, rise temperature was still lower than the exposure unit 1 of the gestalt of implementation of 25 degrees C and the above 1st, and while faults by oxidization of the front face of the reflecting plate 3 which had been produced conventionally, such as local nebula and a squeak, were canceled, Bure of images, such as a jitter, was canceled. Therefore, while forming the fin 5 for heat dissipation in the reflecting plate 3, it was checked by ventilating the reflecting plate 3 with which the fin 5 for heat dissipation was formed from the fan 11 that the cooling effect is improving further.

[0053] In addition, in the gestalt of this operation, although the fan 11 is attached in the left end side of the reflecting plate 3 of drawing 2, a fan 11 may attach in the right end side of a reflecting plate 3, and may attach a fan 11 in each right and left of a reflecting plate 3 according to the magnitude of a temperature rise, and may use it by the push pull.

[0054] Moreover, in the gestalt of the above 1st and the 2nd implementation, although the fin 5 for heat dissipation is arranged in parallel with the longitudinal direction of a reflecting plate 3, the array direction of the fin 5 for heat dissipation may not be restricted to what is arranged to the longitudinal direction of a reflecting plate 3, and may be formed according to the flow

direction of the air ventilated by the reflecting plate 3 from an external fan or the fan 11 attached in the reflecting plate 3. For example, as shown in drawing 3, when the airstream from an external fan or the fan 11 attached in the reflecting plate 3 flows in the direction of a short hand of a reflecting plate 3 (direction shown by the arrow head of drawing 3), the fin 12 for heat dissipation is formed in the direction of a short hand of the reflecting plate 3 with which the airstream concerned flows.

[0055] In addition, as shown in drawing 3, the fin 12 for heat dissipation was formed, and when carried out like the example of an experiment which explained the experiment of the temperature rise of an exposure unit with the gestalt of implementation of the above 1st by the ventilation only from an external fan, the rise temperature of a reflecting plate 3 was suppressed by 30 degrees C.

[0056] Drawing 4 is drawing showing the gestalt of operation of the 3rd of the fixing unit of this invention, and the gestalt of this operation corresponds to claim 4. Drawing 4 is the side-face sectional view of the fixing unit 20 which applied the gestalt of operation of the 3rd of the fixing unit of this invention.

[0057] In drawing 4, the heaters 23 and 24 at which the pressure welding of the fixing roller 21 and the pressurization roller 22 with which the rotation drive of the fixing unit 20 is carried out is carried out, and they heat a fixing roller 21 and the pressurization roller 22 on a fixing roller 21 and the pressurization roller 22, respectively are built in.

[0058] The lower part of the pressurization roller 22 is covered with the bottom plate 25, and while the inner plate 26 is arranged, the fixing covering 27 is arranged in the upper part of a fixing roller 21 so that the upper part of an inner plate 26 and the right-and-left both sides of a fixing roller 21 may be covered. Two or more fins 28 for heat dissipation are formed in the left-hand side external surface of the fixing covering 27, and the fin 28 for heat dissipation is formed in it to the space of drawing 4 in the condition of extending for a long time to predetermined die length, for example, 350mm, covering the direction of a vertical. Cooling air is ventilated from the external fan who does not illustrate by the part in which the fin 28 for heat dissipation of the fixing covering 27 is formed.

[0059] The recording paper with which the feed guide 29 adhered to the toner image is conveyed by the pressure-welding section of a fixing roller 21 and the pressurization roller 22, the toner image in the record paper is fixed to the recording paper with the fixing roller 21 and the pressurization roller 22 which are heated at heaters 23 and 24, and the delivery guide 30 top is discharged on the paper output tray outside drawing.

[0060] Next, actuation of the gestalt of this operation is explained. A fixing unit 20 is in the condition that the fixing roller 21 was heated at the heater 23, and the pressurization roller 22 was heated at the heater 24, if the recording paper which adhered the feed guide 29 top to the toner image is conveyed by the pressure-welding section of a fixing roller 21 and the pressurization roller 22, carries out the welding of the toner in the record paper to the recording paper with the heated fixing roller 21 and the pressurization roller 22, and will discharge a delivery guide 30 top for the recording paper which fixing completed.

[0061] At this time, the wrap fixing covering 27 is heated in a fixing roller 21 by the heat which radiates heat from the fixing roller 21 heated at the pressurization roller 24 and heater 23 which are heated at a heater 22.

[0062] However, to the fixing covering 27, it can prevent that can radiate for it heat and exhaust the heat of the fixing covering 27 efficiently from a radiation fin 28 into it, and the fixing covering 27 is overheated since the fin 28 for heat dissipation is formed in the part by which the cooling air from the external fan is ventilated. That is, since heat required in order to carry out welding of the toner exerts a side effect on the unit around a device, efficient exhaust heat can be performed by combining the flow and the fin 28 for heat dissipation of air inside the plane for heat other than the need the optimal.

[0063] <Example of an experiment> The fixing unit 20 of the gestalt of the above-mentioned implementation was used, and the comparative experiments of the cooling effect with the fixing unit of the same configuration of that the conventional fin for heat dissipation is not formed were conducted.

[0064] The experiment stuck the thermocouple on the top face of the fixing covering 27 of the fixing unit 20 of the gestalt of this operation, and the top face of fixing covering of the conventional fixing unit, and carried out relative measurement of the temperature rise at the time of making fixing actuation perform.

[0065] There was little effectiveness which it cools in case an experimental result flows the side face of fixing covering in which the flow of the air from an external fan was formed in the flat surface, in the conventional fixing unit in which a fin is not formed, therefore the temperature of fixing covering was rising also at 105 degrees C.

[0066] On the other hand, in the fixing unit 20 of the gestalt of this operation, the temperature rise was to 85 degrees C. Therefore, in order that air might flow between many fins 28 for heat dissipation, it was checked that cooling effectiveness is high.

[0067] Drawing 5 is drawing showing the gestalt of operation of the 4th of the fixing unit of this invention, and the gestalt of this operation corresponds to claim 5 and claim 6.

[0068] In addition, the gestalt of this operation is applied to the same fixing unit as the gestalt of implementation of the above 3rd, gives the same sign to the same component as the fixing unit of the gestalt of implementation of the above 3rd in explanation of the gestalt of this operation, and omits the detailed explanation.

[0069] In drawing 5, the fixing unit 40 is equipped with a fixing roller 21, the pressurization roller 22, heaters 23 and 24, the bottom plate 25, the inner plate 26, and the fixing covering 41 grade, and, as for the fixing covering 41, many fins 42 for heat dissipation are formed all over the inside. The radiation fin 32 is formed in the direction in which air tends to flow in the inside of the fixing covering 41.

[0070] Therefore, according to the gestalt of this operation, in the heat generated with the fixing roller 21 and the pressurization roller 22 by the fin 42 for heat dissipation formed in the fixing covering 41 of the fixing unit 40, endoergic and when it carries out accumulation and cooling air flows in heat between endoergic and the fins 42 for heat dissipation which carried out accumulation, heat can be exhausted efficiently.

[0071] <Example of an experiment> The fixing unit 40 of the gestalt of the above-mentioned implementation was used, and the comparative experiments of the cooling effect with the fixing unit of the same configuration of that the conventional fin for heat dissipation is not formed were conducted.

[0072] The experiment has arranged the thermocouple in the location which separated 10mm space to the upper part of fixing covering of the location which separated 10mm space to the upper part of the fixing covering 41 of the fixing unit 40 of the gestalt of this operation, and the conventional fixing unit, and carried out relative measurement of the temperature rise at the time of making fixing actuation perform.

[0073] Although the temperature of the location of 10mm of upper parts of fixing covering was 75 degrees C in the conventional fixing unit in which, as for the experimental result, a fin is not formed, no less than 20 degrees C of the temperature rise were lower than 55 degrees C and the conventional fixing unit in the fixing unit 40 of the gestalt of this operation. Therefore, by this experiment, accumulation was carried out, many fins 42 for heat dissipation exhausted heat by endoergic and the cooling air which flows between this fin 42 for heat dissipation, and it was checked that cooling effectiveness is high.

[0074] In addition, in the gestalt of implementation of the above 4th, the fixing covering 41 may be formed with the insulator using PTFE (poly tetrapod full ethylene) which is heat-resistant plastics, and the fin 42 for heat dissipation may be formed with the high copper alloy or

aluminum-Mg alloy of thermal conductivity.

[0075] If it does in this way, while being able to control radiating heat in the device by which the heat generated from a fixing roller 21 and the pressurization roller 22 by the fixing covering 41 formed with heat insulating materials is applied to the fixing unit 40 And accumulation is carried out. the fin 42 for heat dissipation formed with the aluminum-Mg alloy with high thermal conductivity etc. in the heat generated from the fixing roller 21 and the pressurization roller 22 - efficient - endoergic - By the cooling air which passes the fin 42 for heat dissipation, endoergic and the heat which carried out accumulation can be efficiently exhausted on the fin 42 for heat dissipation.

[0076] <Example of an experiment> In the fixing unit 40 of the same configuration as the gestalt of implementation of the above 4th, the comparative experiments of the thermocouple were installed and carried out to the location of 10mm of upper parts of the fixing covering 41 by the case where the fixing covering 41 and the fin 42 for heat dissipation are constituted from a good aluminum containing alloy of heat conduction, and the case where formed the fixing covering 41 by PTFE of an insulator, and the fin 42 for heat dissipation is formed with the aluminum-Mg alloy of a high temperature conductivity ingredient.

[0077] Both experimental results were 75 degrees C, when the fixing covering 41 and the fin 42 for heat dissipation were constituted from an aluminum containing alloy, but they were PTFE about the fixing covering 41, and when the fin 42 for heat dissipation was constituted from an aluminum containing alloy, they were 45 degrees C.

[0078] Therefore, by setting the ingredient of the fixing covering 41 and the fin 42 for heat dissipation as a heat insulator and a high temperature conductivity ingredient, ambient temperature fell sharply and it was proved that reservation of dependability was secured enough.

[0079] As mentioned above, although invention made by this invention person was concretely explained based on the gestalt of suitable operation, it cannot be overemphasized that it can change variously in the range which this invention is not limited to the above-mentioned thing, and does not deviate from the summary.

[0080]

[Effect of the Invention] According to the exposure unit of invention according to claim 1, since the perimeter of an exposure lamp is established for the fin for heat dissipation in the exposure lamp of a wrap reflecting mirror, and the field of the opposite side, heat can be efficiently radiated through the fin for heat dissipation in the heat of a reflecting mirror, the temperature rise of a reflecting plate can be suppressed low, and the exposure lamp which is the light source of an exposure unit, and the reflecting mirror surrounding it can be cooled efficiently.

[0081] Since the fan who ventilates in air the fin for heat dissipation prepared in the reflecting plate is attached according to the exposure unit of invention according to claim 2, the fin for heat dissipation can be ventilated directly and effectively from a fan, the fin for heat dissipation and a reflecting plate can be cooled, and cooling effectiveness can be raised further.

[0082] Since the fin for cooling is arranged in parallel to the flow direction of the air which flows the perimeter of a reflecting mirror according to the exposure unit of invention according to claim 3, air can flow along the array side of the fin for heat dissipation, and cooling effectiveness can be raised further.

[0083] Since the fin for heat dissipation is prepared in the passage part of the air from the fan of the fixing covering of the fixing unit with which the pressure welding of a fixing roller and the pressurization roller was carried out, and the fixing roller was covered with fixing covering concerned according to the fixing unit of invention according to claim 4 Heat can be radiated with the air from a fan which flows the fin for heat dissipation in the heat of fixing covering, the temperature of the front face of fixing covering can be reduced efficiently, and the thermal effect to a perimeter can be prevented.

[0084] While preparing the fin for heat dissipation in the field by the side of the fixing roller of the fixing covering of the fixing unit with which the pressure welding of a fixing roller and the pressurization roller was carried out, and the fixing roller was covered with fixing covering concerned according to the fixing unit of invention according to claim 5 Since this fin for heat dissipation is ventilated from a fan, with the fin for heat dissipation prepared in the field by the side of a fixing roller not only heat insulation but for heat dissipation using fixing covering The heating value which can cool with the air from a fan and is transmitted [heat / endoergic and / which carried out the collection of heat and was brought together in the fin for heat dissipation] outside from fixing covering in the excessive heat from a fixing roller can be decreased.

[0085] Since according to the fixing unit of invention according to claim 6 fixing covering is formed by the adiathermic good member and the fin for heat dissipation is formed by the member with good thermal conductivity, while being able to carry out a collection of heat, it can control further endoergic or that the heat from a fixing roller is transmitted outside with adiathermic fixing coverings, such as heat-resistant plastics, for surrounding heat with a much more sufficient response with the good fin for heat dissipation of the thermal conductivity of a copper alloy, an aluminium alloy, etc.

[Translation done.]

PRIOR ART

[Description of the Prior Art] In a copying machine, a laser beam printer, a scanner, etc., it has exoergic units, such as an exposure unit and a fixing unit, and it is an important problem how heat is radiated and the heat generated from these exoergic units is exhausted.

[0003] For example, a copying machine will be divided into the optical unit which used the lamp which reads a manuscript optically, the imaging unit which performs each process of electrification -> exposure -> development -> imprint -> electric discharge for a photo conductor, a development unit, the fixing unit which carries out welding of the toner in the copy paper to paper, and a part by five units of a power supply unit if the unit configuration is divided roughly.

[0004] Only a fixing unit needs heat among these five units, heat occurs as a side effect and it is important for other units how heat is radiated and these generated heat is exhausted so that neither electronic parts nor process control may be affected.

[0005] In an optical unit, the reflecting plate arranged in the perimeter of a halogen lamp since the halogen lamp was generally used is heated by the exposure unit with a halogen lamp, the life of a halogen lamp is affected, or the metal side of a reflecting plate oxidizes, and the problem of the quantity of light irradiated by the manuscript decreasing arises.

[0006] Although the fan was attached and the whole exposure unit was cooled in order to cool an exposure unit conventionally, the hot spot where temperature is high cannot be cooled efficiently.

[0007] Moreover, the heat which the fixing unit needs has a thermal effect on surrounding passive circuit elements etc., or a fixing unit raises the temperature in [whole] a copying machine, and fault, such as having a bad influence on process control, produces it. Then, generally, although the heat exhaust air by the fan was performed or measures, such as heat insulation, were taken, effectiveness was not able to say conventionally that it was good too.

[0008] In addition, the conventional air-cooling method of general electronic equipment as indicated by JP,63-108800,A As passage is secured for the flow of the air of air supply and exhaust within a case, it cools or nature and forced-air cooling are indicated by JP,2-82693,A by making a case into a first-class way Having the inhalation means and ventilating fan for circulating air within and without a case, and forming a septum so that the flow of air may be made to separate, and cooling an equipment is performed.

[0009] Moreover, the technique of raising the cooling engine performance is indicated by JP,6-318124,A by centralizing a high heater element on one place, and connecting with the heat sink which turned and prepared them in the case exterior.

[Translation done.]